GEOLOGICAL

and

ELECTROMAGNETIC (VLF) SURVEYS

on

part of

STRATHY-CASSELS GROUP

Hollinger Mines Limited

Timmins, Ontario
December 21, 1977

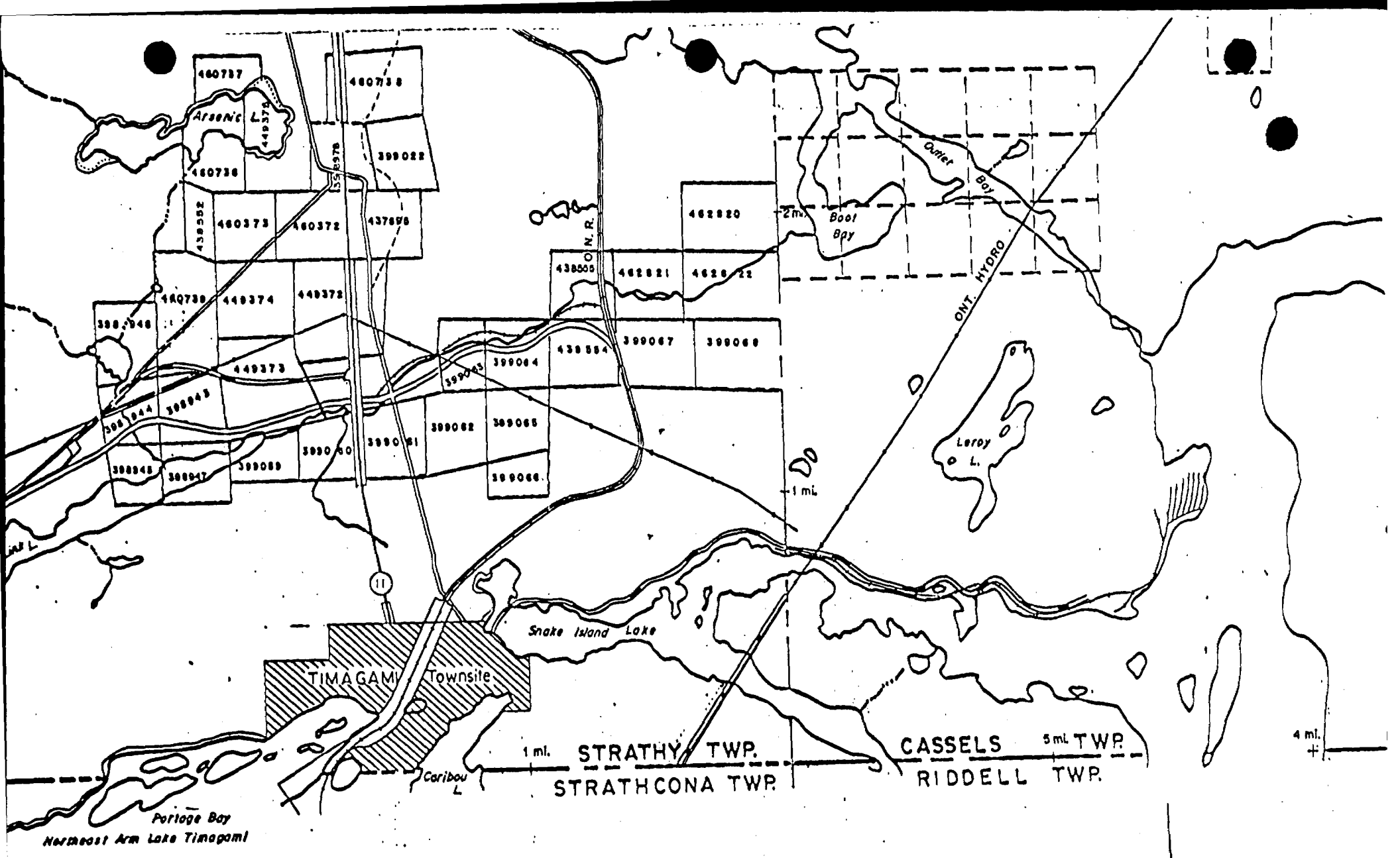
D. R. Alexander

ACKNOWLEDGMENTS

The author gratefully acknowledges Mr. P.J. Bateman of Hollinger Mines Limited - author of a previous assessment report covering the western portion of this group (5 claims, November, 1977).

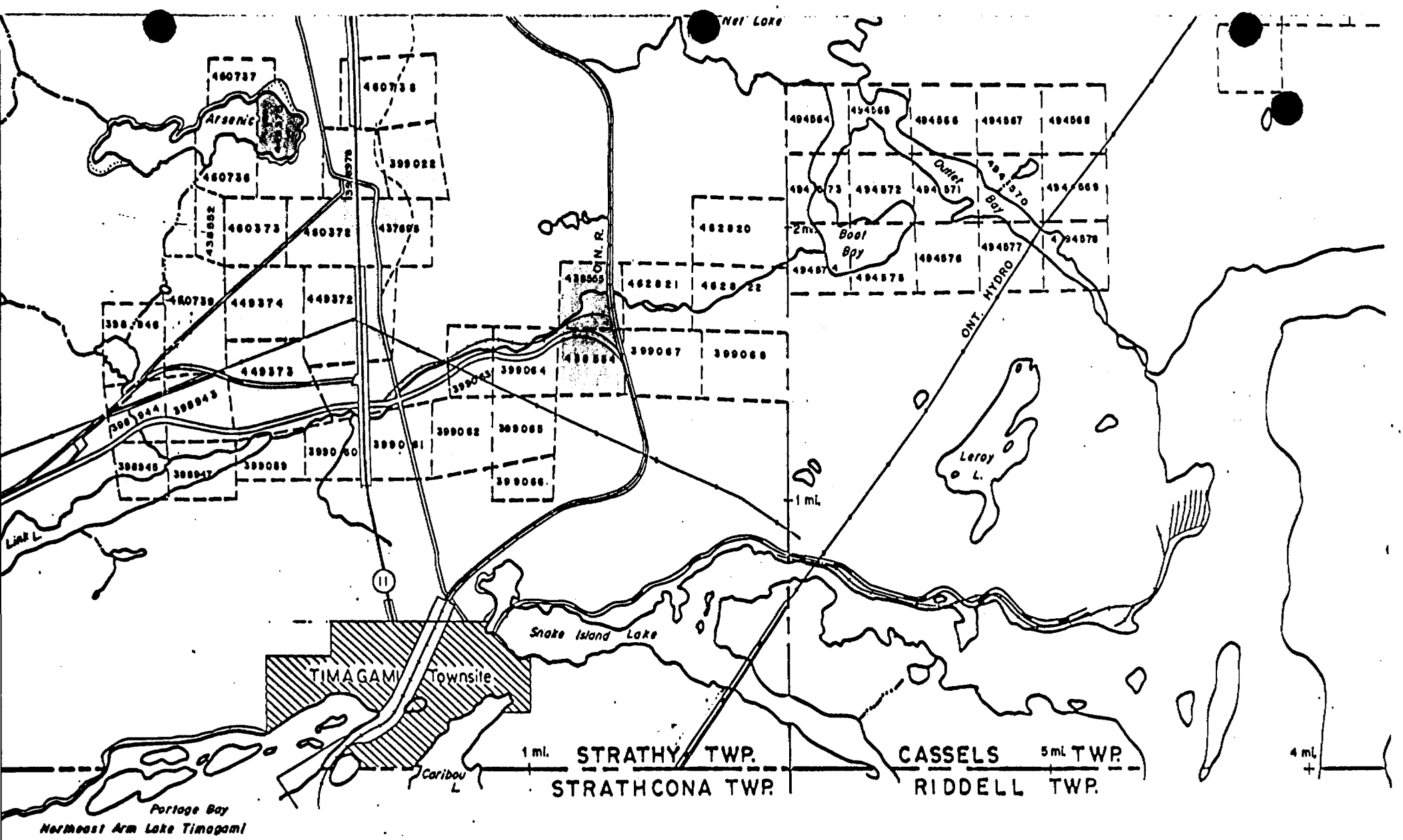
In most instances, geological descriptions, both general and specific, are characteristic of the larger group and have been extracted in some cases verbatim, from Mr. Bateman's publication.

The author further acknowledges the contribution of the Ontario Department of Mines towards this preliminary geological report - particularly the work of W.S. Savage appearing in the Forty-fourth Annual Report of the Ontario Department of Mines (part 7).



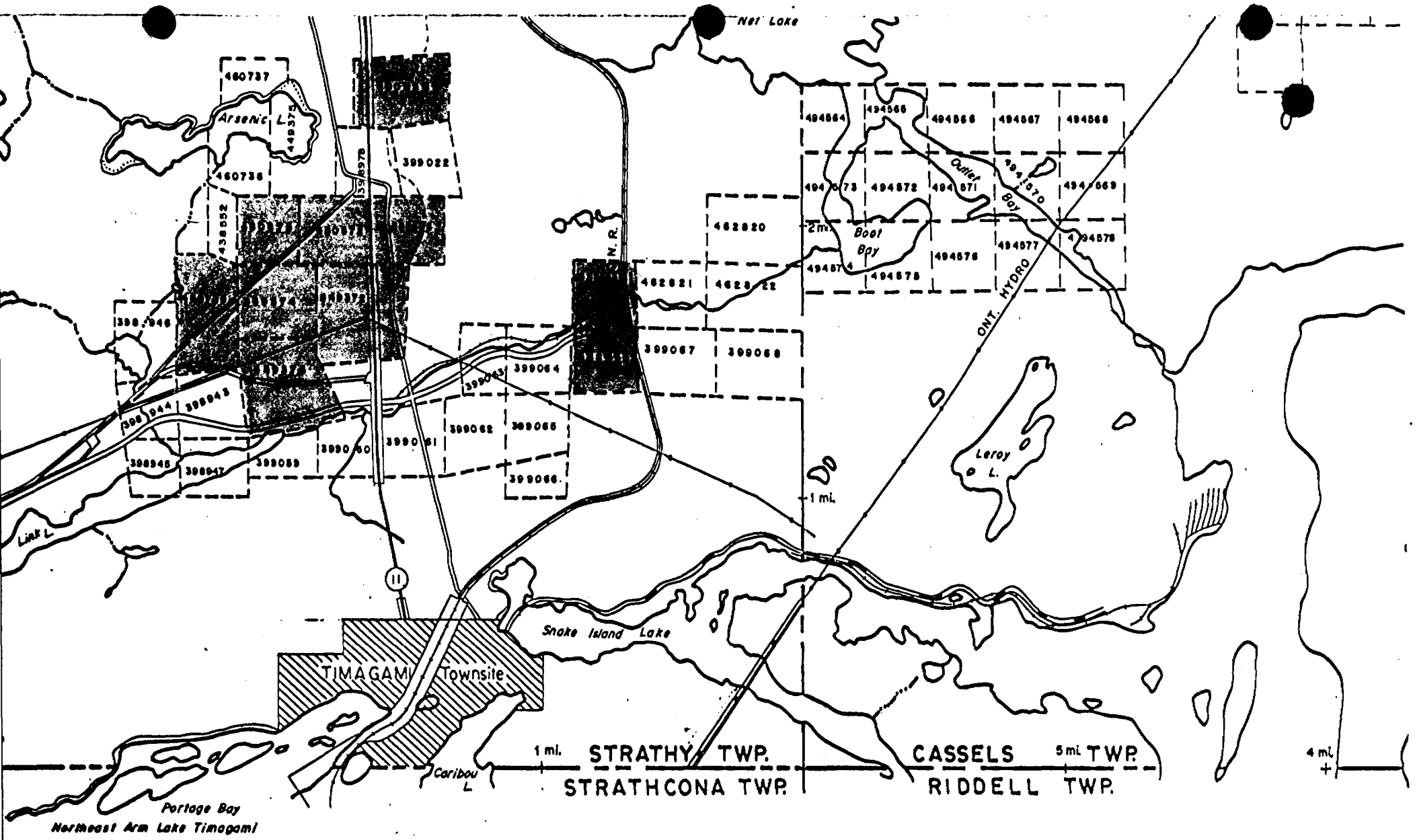
CLAIM SKETCH OF STRATHY-CASSELS PROPERTY

Scale : 1" = 40 chains



CLAIM MAP SHOWING GEOLOGY COVERAGE

Scale : 1" = 40 chains



CLAIM MAP SHOWING EM-16 COVERAGE

Scale : 1" = 40 chains

TABLE OF CONTENTS

010C

Page

ACKNOWLEDGMENTS. . . . . (i)

CLAIM MAP. . . . . .

INTRODUCTION 1

TOPOGRAPHY 2

PREVIOUS WORK. 2

REGIONAL GEOLOGY

General 3

Structure 8

Economic Geology. 8

GEOLOGY OF THE PROPERTY

Rock Types and Distribution 10

Structure 13

Economic Geology. 15

RESULTS OF THE VLF SURVEY. 16

CONCLUSIONS. 16

SELECTED BIBLIOGRAPHY. 17

Tables

Table #1. Table of Formations 6

Maps

Claim Map Showing Geology Coverage
1" = 40 Chains..... following pg. 1

Claim Map Showing EM-16 Coverage
1" = 40 Chains..... following pg. 1

Geological Plan, Manderstrom-Morrison-
Niemetz Option, 1" = 400' (1:4800)..... in pocket

Electromagnetic Plan, Manderstrom-Morrison-
Niemetz Option, 1" = 400' (1:4800)..... in pocket

INTRODUCTION

During the period September 12 to October 14, 1977, geological and electromagnetic (VLF) surveys were carried out over part of the Strathy-Cassels property. The writer was ably assisted during the course of these surveys and subsequent compilation, by W. H. King and P. J. Bateman of Hollinger Mines Limited.

The Strathy-Cassels property consists of 49 contiguous, unpatented mining claims in Strathy and Cassels Townships. The group is held under option from Messrs. Wm. Manderstrom and H.W. Niemetz of Temagami, Ontario, and Mr. Wm. Morrison of Agincourt, Ontario. Exploration was undertaken as a joint venture between Hollinger Mines Limited, Timmins, and St. Joseph Explorations, Toronto.

This report is a preliminary investigation of the geology on the property, and should not be regarded as a definitive statement, since additional mapping and a more comprehensive interpretation of previous work remains.

The claims covered for assessment by these surveys are shown on the sketches (following) entitled:

Claim Map showing Geological Coverage
Claim Map showing EM-16 Coverage

The Strathy-Cassels group extends some 7 km (4 mi.) across southeast central Strathy Township into west central Cassels Township.

The property is readily accessible via Highway 11, which traverses the western part of the overall group. The town of Temagami lies approximately 2 km south of the property.

Assorted municipal service roads, rail lines and bush roads provide additional access to some of the more remote areas.

TOPOGRAPHY

To simplify data presentation, topographic features are not included on the accompanying geological and electromagnetic plans.

In general, those areas with fairly continuous rock exposure, form prominent ridges supporting jack pine, spruce, fir, poplar and birch vegetation. Lower elevations inevitably lead to thick cedar, and cedar-alder swamps which normally extend within a few feet of the open rhododendron swamps associated with creek-lake margins.

The overall variance in relief on the property amounts to some 35 metres (125 feet).

PREVIOUS WORK

Showings of Fe, Au and Ni-Cu were prospected in the area as early as the 1890's. The first geological map was produced by A.E. Barlow of the G.S.C. in 1907. Subsequent government mapping included that of W.W. Moorhouse in 1942, and G. Bennett and D.G. Innes in 1971.

The present claim-group was part of the former Maralgo Mines property extending from Totem Lake to within 2 claim lengths of the Cassels Township boundary. Their ground was covered by geological and ground magnetic surveys prior to an AQ diamond drilling program in 1956. Two holes were drilled on each side of Highway #11, but the main area of interest centred east of the highway and north of Johnny Creek on a mineralized, altered, felsic volcanic breccia (see accompanying geological plan). Sulphides with associated arsenopyrite occur in local subsidiary shears north of the main shear zone, and were tested by 13 drill-holes totalling 4923 feet (1477 metres). Cu and Zn values were generally low and Au values erratic. The best results were

0.56% Cu, 0.07% Zn and 3.63 oz. Ag/ton from 230 feet (69 m.) to 245 feet (73.5 m.) in Hole #7, and 0.22% Cu, 3.57% Zn, and 1.40 oz. Ag/ton from 335 feet (100.5 m.) to 345 feet (103.5 m.) in Hole #8.

Narrow gold-silver-arsenic occurrences with a variety of associated sulphides appear to be the norm in this vicinity. To that end, exploration, with a few successes, has proceeded on the Big Dan and the Manitoba and Eastern Mines Limited showings. Several other companies and prospectors have similarly investigated the area - most surveys concluding with a diamond drilling programme. Thus, rather than summarize each assessment report individually, drill holes and interpreted geology are plotted on the accompanying geological plan as the most convenient method to display the data.

REGIONAL GEOLOGY

General

The Temagami metavolcanic belt is a relatively small remnant (maximum of 16 by 20 miles, 25 by 32 km) of Keewatin 'basement'. Together with adjacent granitic plutons, they form a 'window' of Superior-type rocks surrounded by Huronian strata in the Cobalt plain of the Southern province (Card et al, 1972). Strathy Township is underlain by the northeastern part of the belt, and is about 15 miles (24 km) north of the Grenville Front.

The 'greenstone' belt consists of a layered metavolcanic sequence which ranges in composition from basalt to rhyolite, and is overlain by metasediments. The combined thickness of metavolcanics in Strathy Township (entire north limb of Lake Tetapaga Syncline) may total as much as 20,000 feet (6000 metres); however, parts of the sequence may be repeated or truncated by one or more of several regional faults.

The oldest rocks exposed are fine- to medium-grained basalts and andesites, which vary from massive and structureless, to pillowed, vesicular, amygdaloidal, or variolitic. Flow units range from 300 feet (90 m.) to 5000 feet (1500 m.) thick. There are also a few exposures of purplish andesite with chloritic clots and occasional small yellowish leucoxene grains. Basic agglomerate and breccia are relatively abundant, being either massive and undeformed, or sheared with lenticular fragments.

Dacitic flows or tuffs overlie the basic metavolcanics along with intermediate volcanic breccias. These are succeeded upward in the section by rhyolite flows and tuffs. Acid flow units are from 300 feet (90 metres) to 3000 feet (900 metres) thick, and are particularly abundant around Vermilion and Link Lakes. The felsic tuffs are usually altered and sheared. Quartz porphyry is abundant in the area and intimately associated with the felsic metavolcanics, probably as subvolcanic intrusives.

The top of the section, or of each major volcanic cycle, consists of metasediments and/or iron formation. The metasedimentary units are from 200 feet (60 metres) to 1000 feet (300 metres) thick, and are composed of laminated slate and greywacke with or without volcanogenic tuffs. The oxide facies iron formation is made up of alternate bands of massive magnetite, sugary white quartzite, jasper, grey cherty quartz, and/or tremolite-chlorite tuff. Units of banded iron formation range from a few feet (1 to 2 metres) to more than 500 feet (150 metres) thick.

The layered sequence is intruded by 300 foot (100 m.) to 700 foot (210 m.) thick sills of medium-grained, white-weathering, quartz diorite. These rocks are similar to the coarse thicker parts of basic flows, but are thought to be partly intrusive, and possibly mafic feeders. The main sill along the Northeast Arm (Portage Bay) of Lake Temagami may even be differentiated, as the north part is very siliceous with local aplite dykes. The south contact of this dyke is marked by chlorite schist and speckled with yellowish flecks of leucoxene.

South of Kanichee Lake on the old Cuniptau property, the metavolcanics are intruded by an oval stock of gabbro with minor peridotite and diorite (the Ajax Intrusion - Bennett, 1975). The ultramafic phase appears to be altered to a mixture of fibrous hornblende and serpentine.

Northeastern Strathy Township is principally underlain by the Chambers-Strathy granitic 'batholith' composed of coarse massive pink quartz monzonite with marginal finer-grained sheared grey trondhjemite. Diorite and quartz diorite are also found as hybrid phases bordering granitic plutons. Both intrusive and extrusive rocks appear to have been regionally metamorphosed to greenschist facies grade.

Altered diabase and a few lamprophyre dykes intrude the complex along north and west-northwest trends. Many of these diabasic or dioritic rocks are altered to amphibole and chlorite.

Bordering the entire metavolcanic belt are the generally flat-lying, relatively undeformed rocks of the Southern Province. Belonging to the Gowganda Formation of the Cobalt Group, and consisting of conglomerate ('tillite'), quartzite, slate, and greywacke, these sediments occur in the very southeast corner of Strathy Township.

Sills of Nipissing diabase are fairly widespread in the area, especially in north-central Strathy and southeast Strathcona Townships. The last intrusive event is represented by persistent olivine diabase dykes up to 20 feet (6 metres) wide, striking 280° to 310° azimuth.

The bedrock has been glaciated and overlain by deposits which include tills, eskers, local thin moraines, and minor varved clays. Thick morainic deposits are not found, but erratics are common. Glacial striae and chatter marks indicate that ice movement was from north to south.

A table of formations is presented below.

Table #1. Table of Formations

PHANEROZOIC

CENOZOIC

Recent

- swamp and stream deposits; sand

Pleistocene

- glacial deposits

-- Great Unconformity --

PRECAMBRIAN

PROTEROZOIC

Late Mafic Intrusive Rocks - Second Event (Keweenawan?)

- olivine diabase

-- Intrusive Contact --

Late Mafic Intrusive Rocks - First Event (Nipissing?)

- quartz diabase, gabbro

-- Intrusive Contact --

Late Metasediments (Huronian-Cobalt Group-Gowganda Fm.)

- greywacke,siltstone,argillite,quartzite,conglomerate and/or tillite

-- Unconformity --

ARCHEAN

Mafic Intrusive Rocks (Matachewan?)

- altered diabase, diorite, lamprophyre

-- Intrusive Contact --

ARCHEAN (cont'd)

Felsic Intrusive Rocks (Algoman?)

- quartz monzonite, trondhjemite, aplite, hybrid diorite, quartz porphyry*

-- Intrusive Contact --

Early Mafic Intrusive Rocks (Haileyburian?)

- diorite*, quartz diorite*, gabbro, quartz gabbro, serpentinite, pyroxenite, peridotite

-- Intrusive Contact --

Metasediments

- greywacke, siltstone, conglomerate, and volcanogenic equivalents
- iron formation

Metavolcanics

- rhyolite, rhyodacite, felsic volcanic breccia, agglomerate, lapilli tuff, tuff, carbonatized and sheared metavolcanic, quartz porphyry*
- dacite volcanic breccia, tuff, lapilli tuff, and crystal tuff
- massive to foliated andesite and basalt, porphyritic andesite and basalt, pillowed mafic flows, amygdaloidal basalt and andesite, mafic lapilli tuff and agglomerate, amphibolite, diorite*

* it is uncertain to which age these rocks belong.

Structure

The layered metavolcanic sequence has a general strike that varies from east to northeast across the region. Variations in strikes and schistosities are probably due to granitic intrusion. The Keewatin rocks are folded into the Lake Tetapaga Syncline whose axis crosses Lake Tetapaga in southwest Strathy Township and trends parallel to and south of Link Lake. Top determinations are based on grain gradation, pillow tops, minor drag fold evidence and agglomeratic fragments from underlying beds.

The area is traversed by NE to ENE lineaments - some of which mark NW-dipping shear zones, and local intense zones of ankeritization. Two of the more important of these shear zones follow along the Northeast arm of Lake Temagami, and just north of Link Lake. Many of the complimentary tension fractures are mineralized. There are also several older N and NNE faults evidenced by micro-structures and micro-topography.

Economic Geology

In the early part of this century, there was minor production of arsenopyrite, pyrite, molybdenite, and Cu-Ni matte from the Temagami metavolcanic belt. Since 1955, Cu, Ag and Au have been produced from the mine of Copperfields Mining Corp. on Temagami Island. The Copperfields ore-bodies are of two main types - one a contact deposit of low grade, presently uneconomic, pyrite-chalcopyrite-millerite-pyrrhotite-linnaeite 'ore' at the south contact of a diorite sill with rhyolite. Three main lenticular zones occur within the sill's south margin which is intensely chloritized. This diorite follows the Northeast Arm of Lake Temagami, dips northwest at 65^{o}, and has had base metal mineralization traced along it for five miles.

Within the acid volcanics south of the diorite are lenses of massive chalcopyrite with pyrite, millerite, sphalerite, magnetite, and gersdorffite - as well as steeply dipping fissure-filling quartz carbonate veins with chalcopyrite. In March 1959, a 200 ton/day mill started processing ore from 2 open pits and underground workings off a 2516 foot (755 metre) shaft. To February 1972 at which time the operation shut down, the mill had treated 672,482 tons of ore to yield 76,982,986 lbs. of Cu, 175,979 oz. Ag, and 9,125 oz. Au.

Iron ore has been mined in southwest Strathy Township and southeast Chambers Township at the Sherman Mine since 1968. With an average overall grade of 25% Fe, the mine processes about 10,700 tons of crude ore per day. The plant capacity is 1,000,000 long tons of pellets per year, and 1968 reserve figures indicated a mine life of 35 years.

The focus of minor Cu-Ni matte production in the late 1930's was the NW ultrabasic rim of a gabbro stock at the old Cuniptau Mine, now part of Kanichee Mining Inc. At the start of 1974, the shaft orebody contained an estimated 429,376 tons averaging 0.75% Cu and 0.42% Ni with values in Au, Ag, Pt and Pd. Another orebody to the south of the shaft area contained an estimated 250,000 tons of lower grade Cu and Ni.

Gold prospects are numerous throughout the region - usually as arsenopyrite-bearing or pyritic, quartz veins, shears and silicified zones. Accessory pyrrhotite, chalcopyrite, sphalerite and galena are common associated minerals. One of the largest showings is the Beanland prospect (currently held by A.E. Perron) in central Strathy Township. This deposit is estimated to contain about 24,000 tons averaging 0.21 oz. Au/ton across a 5.2 foot (1.6 metre) mining width.

Molybdenite occurs with chalcopyrite in brecciated mafic metavolcanics and quartz veins north of Goward in northeast Strathy Township. A shipment of 1216 pounds of this material to Ottawa in 1918 yielded 94 pounds of MoS_2.

GEOLOGY OF THE PROPERTY

Rock Types and Distribution

The Strathy-Cassels claim group has endured a long and complicated geologic history from early Archean vulcanism to Keweenawan period diabasic intrusion.

The oldest rocks exposed on the property comprise a suite of mafic volcanics with both flow and pyroclastic members.

Of the flow members, the unit along the south part of claim 438554 is worthy of comment. There, a medium to fine grained andesite is in contact with dacitic tuffs - the contact being gradational and conformable, where seen. This unit is different from most of the remaining andesitic flows on the property for it grades progressively coarser grained southwards. Plagioclase, hornblende(?) and chlorite are the megascopic constituents of the coarser grained variety.

Elsewhere on the property, flow units are basically divisible into two types:

(a) very fine grained, dark green chloritic zones

and (b) fine to medium grained metamorphosed sections. (A_2B and B units on accompanying plan).

The former occur as massive to pillowed lavas which are amygdaloidal to spherulitic in part. An interesting unit just south and east of Arsenic Lake contains pisolites (up to 1 cm in size). These elliptical to orbicular structures are commonly pea-sized, massive and pale greyish to putty coloured. Neither zoned, nor radiating features are noted to suggest a spherulitic (variolitic) genesis. Flow breccias are locally seen in these rocks.

In many instances, due possibly to increased carbonatization, contacts between andesitic and dacitic units are gradational.

The coarser grained to granular sections of andesite are more common along the western portions of the claim group. Easily confused with the dioritic intrusives, these rocks are normally distinguished by the absence of leucoxene and consistency of grain size.

Fragmental mafic volcanics are quite rare on the map sheet, although local tuffaceous to more coarsely fragmental horizons do occur.

Presumed to be younger than the mafic suite of rocks, the intermediate volcanics span a similar range in mode of occurrence.

Along the ridge on claim 438554, the dacitic rocks are yellowish green to grey green tuffs. The character of these tuffs varies from closely banded to granular and coarsely tuffaceous. Fragments range in size from 1 mm or so, in the granular horizons, up to 1 cm (average size 3-4 mm) in the coarser units.

On the remainder of the property, most of the dacitic exposures are fine to medium grained and massive with localized pillowed, brecciated or spherulitic sections. On one zone, east of XL 00 at 2+00N (central part of claim 449372), the dacite is a coarse fragmental to agglomerate that is marginal in composition to rhyolite. Fragments are layered into coarse and fine horizons - the coarser fragments (to 1 m.) being adjacent to the rhyolitic outcrops.

Rhyolitic exposures are not nearly as common as the mafic to intermediate volcanics. The rhyolite flow units are typically fine grained, hard and cherty, with or without quartz 'eyes'. The fresh surfaces vary from off-white to yellowish and grey tones.

In the northwestern portion of the property (northwest corner of claim 460737), a medium grey, cherty rhyolite with

occasional quartz 'eyes' is in contact with a dark green chloritic andesite. The contact is marked by a narrow rusty shear carrying erratic amounts of pyrite and pyrrhotite. Traces of chalcopyrite were also noted.

Several units of rhyolite appear to warrant an intrusive classification. In at least five instances, units of rhyolite are distinguished as flow members - having been mapped as fine grained, hard, cherty units with scattered quartz 'eyes'. Contacts, however, do not conform with other units in the volcanic pile. Further, at one locality just east of Arsenic Lake, the rhyolite is black in colour - somewhat more indicative of an intrusive phase. Thus care should be taken in projecting these units, to avoid attributing variations in strike to a deformational rather than an intrusive event.

Fragmental units of rhyolite are only exposed along the southern part of the group. The band across the central portion of claim 449372 is, by far, the most interesting. Here, a mixture of rhyolite agglomerate and agglomeratic chert carries erratic fragments and bombs up to 25 cm in size. Sulphide clasts from 5 mm to 25 cm are also present. The agglomeratic chert sections are massive to amorphous with a variable sericite, ankerite content.

The volcanic complex has been intruded by a series of dioritic dykes considered to be part of the Haileyburian period. Both fine and coarse grained phases are recognized with feldspar, hornblende and chlorite being megascopically visible. The fine grained phases are normally distinguished from the coarse grained flow rocks by an abundance of straw coloured leucoxene flecks. The diorite varies from dark grey green to dark green in colour, is variably carbonatized and moderately to nonmagnetic.

The diorite, itself, has been intruded by feldspar porphyry - in bodies and tongues from 30 to 550 feet (9 to 165 metres) thick. The rock is medium-grained, massive, mottled

green-grey and dark green with some scattered white-cream, orange or pale green feldspar phenocrysts to 5.0 mm, non-magnetic, and weakly carbonatized. Hairline slips are usually coated with chlorite and/or sericite. Surfaces weather buff or pale green-grey.

The distribution pattern coupled with rare visible intrusive contacts support the intrusive relationship between diorite and porphyry. However, the two rock-types are commonly difficult to distinguish in hand specimen, and petrographic work may change the interpretation shown on the accompanying map. An alternative theory - namely, that the porphyry represents a felsic differentiate of the diorite 'sill' - gets minor support from the relative positions of porphyry and diorite.

The latest Archean intrusive event on the property includes a series of north to northwesterly trending diabase dykes, assigned to the Matachewan period. These dykes rarely exceed 30 cm in width and are often offset minor amounts along joint planes and fractures. The rocks are dark green to black in colour, fine grained, hard and magnetic.

Late stage intrusive activity is seen in the form of northwest to west-northwesterly trending olivine diabase dykes. These dykes are considered to be part of the Keweenawan period. The rock is coarse grained, mottled black, white-grey and reddish brown, locally friable, non-carbonatized and strongly magnetic.

Structure

The layered volcanic assemblage which underlies the map-area is part of the north limb of the ENE-trending Lake Tetapaga Syncline - the axis of which is 2200 feet (660 metres) south of

Link Lake. There is also a remote possibility that the diorite sills on either side of the synclinal axis are differentiated, with the upper felsic parts indicating tops toward the axis.

The oldest faulting evident on the property follows a NW to WNW trend, subsequently intruded by olivine diabase. This break produced a sinistral offset up to 300 feet (90 metres). A northeast fault with a minor dextral strike-slip component is interpreted across Link Lake, and the base-line just west of XL 16W, from preliminary ground magnetic survey results of St. Joseph Explorations Limited. Little geological evidence is available as support; however, the fault trace may be the extension or part of a zone indicated south of Link Lake on ODM Map 51e (Moorhouse, 1942).

The Link Lake Shear Zone which follows the axis of Link Lake, appears to traverse the northern portion of claim 438554. There, as well as further west (XL 28E and XL 32E around the railroad), the volcanics are strongly sheared and ankeritized. Projection of this zone eastwards should await further mapping and compilation. The amount of displacement along this N70°E feature is unknown.

Although rather widely separated, narrow, rusty, shear zones were noted across the map area. These shears occur in general northeast, northwest, east-northeast and northerly trending systems. Many of the shears carry erratic amounts of sulphides and/or quartz, such that certain shears have some record of production for gold. Of these, the Big Dan, Manitoba and Eastern Mines Limited and the J.S. Milne occurrences were the most successful.

Upon projecting several of these minor structures, some element of control appears to be exercised on the dioritic intrusives. The lack of continuous exposure over the limits of these shears, however, does not allow a clear definition of any displacement. From reviewing the literature on the area, these structures appear to reflect (or complement) regional faulting.

Economic Geology

Of particular interest to the Strathy-Cassels group are the narrow sulphide shear zones which have recorded brief, if not extensive development. Production, however, has been on a very limited scale due to the narrowness of the occurrences and the erratic values in gold.

The shears carry variable amounts of sulphides including pyrite, pyrrhotite, arsenopyrite, chalcopyrite, sphalerite and galena.

Typical of these occurrences, the Manitoba and Eastern Mines Limited 'deposit' (which projects onto the property), recorded the following statistics on their number one zone in 1935:

> ".....three ore shoots were indicated as follows: on the 300-foot level, one shoot averaging .23 ounces over a width of 4.17 feet for a length of 205 feet; on the 200-foot level, two shoots, one averaging .274 ounces over a width of 2.9 feet for a length of 81 feet, and another .33 ounces over a width of 3.1 feet for a length of 52 feet." (1)

Since additional development proceeded after the release of those statistics, it can only be assumed that the above 'ore' has been extracted.

In general, those shears noted during the course of the geological mapping were too narrow and too widely separated, to be of more than geological interest.

---

(1) after Savage, W.S.

RESULTS OF THE VLF SURVEY

The results of the EM-16 survey are plotted on the accompanying plan (in back pocket). Unfortunately, the proximity of hydro lines, pipelines, railroads, creeks and the like produce significant interference for this particular instrument. Thus, it is not possible to distinguish a valid electromagnetic anomaly over most of the group. Further, in areas divorced from this interference, no electromagnetic anomalies are recognized.

Perhaps a Fraser plot of the survey would simplify the presentation, but a preliminary inspection of the profiles suggests that the survey should be disregarded.

CONCLUSIONS

Although the rock types seem favourable for strata-bound sulphide deposits, and a few significant assays have been obtained, the showings found to date are only narrow, mineralized fractures complementary to regional shearing. The possibility of finding larger sulphide lenses of a similar mineralogy appears remote in this particular portion of the claim group. Any final analysis of the property, however, should await completion of the surveys for the remainder of the group. Thus, it is recommended that exploration should run its normal course of preliminary geological and geophysical surveys before a judgment is made.

Dale R. Alexander

Dale R. Alexander.

HOLLINGER EXPLORATION

SELECTED BIBLIOGRAPHY

Bateman, P.J. (1977) - Geology of part of the Strathy-Cassels Group, Strathy Twp., Dist. of Nipissing; Hollinger Mines Ltd. assessment report.

Bennett, G. (1974) - The Geology of the Northeast Temagami Area, Dist. of Nipissing; Ont. Div. of Mines, Open File Report 5110.

Bennett, G. and Innes, D.G. (1971) - Strathy Twp., Dist. of Nipissing; O.D.M. Preliminary Map, P.667 Geol. Ser., Scale: 1" = ¼ mile.

Bennett, G. and Innes, D.G. (1975) - Chambers and Strathy Twps., Nipissing Dist.; Ont. Div. of Mines, Map 2323, Scale: 1" = ½ mile.

Hurst, M.E. (1927) - Arsenic-bearing Deposits in Canada; GSC Economic Geol. Series #4, pp. 118-121.

Knight, C.W. (1920) - Windy Lake and Other Nickel Areas; ODM Vol. 29, pt. 1, pp 214-219.

Moorhouse, W.W. (1942) - The Northeastern Portion of the Timagami Lake Area; ODM Vol. 51, pt. 6.

Sabina, A.P. (1974) - Rocks and Minerals for the Collector, Cobalt-Belleterre-Timmins; GSC paper 73-13, pp. 6-13.

Savage, W.S. (1935) - Part of Strathy Township; ODM Vol. 44, pt. 7, pp. 48-56.

Assessment files - Resident Geologist's Office, Sudbury.

Ontario

31M04SW0091 2.2568 STRATHY

900

File 2.2568

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Electromagnetic (VLF)

Township or Area Strathy Township

Claim Holder(s) Hollinger Mines Limited
Box 320, Timmins, Ont. P4N 7E2

Survey Company Hollinger Mines Limited

Author of Report D. R. Alexander

Address of Author c/o Hollinger Mines Limited
Box 320, Timmins, Ont.

Covering Dates of Survey Sept. 12 - Oct. 14, 1977
(linecutting to office)

Total Miles of Line Cut 17.95

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
--Electromagnetic	20
--Magnetometer	
--Radiometric	
--Other	
Geological	
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Dec. 21, 1977 SIGNATURE: Dan R. Alexander
Author of Report or Agent

Res. Geol. _____ Qualifications _____

Previous Surveys

File No.	Type	Date	Claim Holder
			L.D

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
S	437695
S	438554
S	438555
S	449372
S	449373
S	449374
S	450372
S	450373
S	450738
S	450739

TOTAL CLAIMS 10

If space insufficient, attach list

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations 812 Number of Readings 812

Station interval 100 feet Line spacing 400 feet

Profile scale 1" = 40%

Contour interval N/A

MAGNETIC

Instrument

Accuracy – Scale constant

Diurnal correction method

Base Station check-in interval (hours)

Base Station location and value

ELECTROMAGNETIC

Instrument Geonics EM-16 Serial No. 48

Coil configuration Horizontal receiver

Coil separation infinite

Accuracy ± 1 degree

Method: ☒ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency 17.8 KHz - Station NAA, Cutler Maine
(specify V.L.F. station)

Parameters measured in-phase and quadrature

GRAVITY

Instrument

Scale constant

Corrections made

Base station value and location

Elevation accuracy

INDUCED POLARIZATION
RESISTIVITY

Instrument

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time Frequency

– Off time Range

– Delay time

– Integration time

Power

Electrode array

Electrode spacing

Type of electrode

Ontario

Ministry of Natural Resources

File 2.2568

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geological

Township or Area Strathy Township

Claim Holder(s) Hollinger Mines Limited
P.O. Box 320, Timmins, Ont. P4N 7E2

Survey Company Hollinger Mines Limited

Author of Report D. R. Alexander
c/o Hollinger Mines Limited

Address of Author Box 320, Timmins, Ont.

Covering Dates of Survey June 6 - Oct. 14, 1977
(linecutting to office)

Total Miles of Line Cut 17.95

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
S -	399022
S -	437695
S -	438552
S -	438554
S -	438555
S -	449372
S -	449373
S -	449374
S -	449375
S -	460372
S -	460373
S -	460736
S -	460737
S -	460738
S -	460739

TOTAL CLAIMS 15

If space insufficient, attach list

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim

Geophysical
–Electromagnetic
–Magnetometer
–Radiometric
–Other
Geological 40
Geochemical

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer Electromagnetic Radiometric
(enter days per claim)

DATE: Dec. 21, 1977 SIGNATURE: Dave R. Alexander
Author of Report or Agent

Res. Geol. Qualifications 2.142

Previous Surveys

File No.	Type	Date	Claim Holder
			L.D.

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION
RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

24+00 W. BASE LINE

0+00 BASE LINE

0+00 Base Line

ARSENIC LAKE

LINK LAKE

PORTAGE BAY
(Northeast Arm of Lake Timagami)

TEMAGAMI TOWNSITE

SNAKE ISLAND

ARIBOU LAKE

Johnny Brook

Ont. N. R.

HWY. 11

460738

460373

460372

437695

449374

460739

449372

449373

438555

438554

56 N
52 N
48 N
44 N
40 N
36 N
32 N
28 N
24 N
20 N

52 W
48 W
44 W
40 W
36 W
32 W
28 W
24 W
20 W
16 W
12 W
8 W
4 W

12 E
16 E
20 E
24 E
28 E
32 E
36 E
40 E
44 E
48 E
52 E

LEGEND

In-Phase
Quadrature
True X-over
Reverse X-over
+20%
0
-20%
CONDUCTOR
Primary Field

LEGEND

20% 0 +20%
True X-OVER
CONDUCTOR
REVERSE X-OVER
Primary Field

AST.

HOLLINGER MINES LTD.

Manderstrom - Morrison - Niemetz Option

STRATHY & CASSELS TWPS.

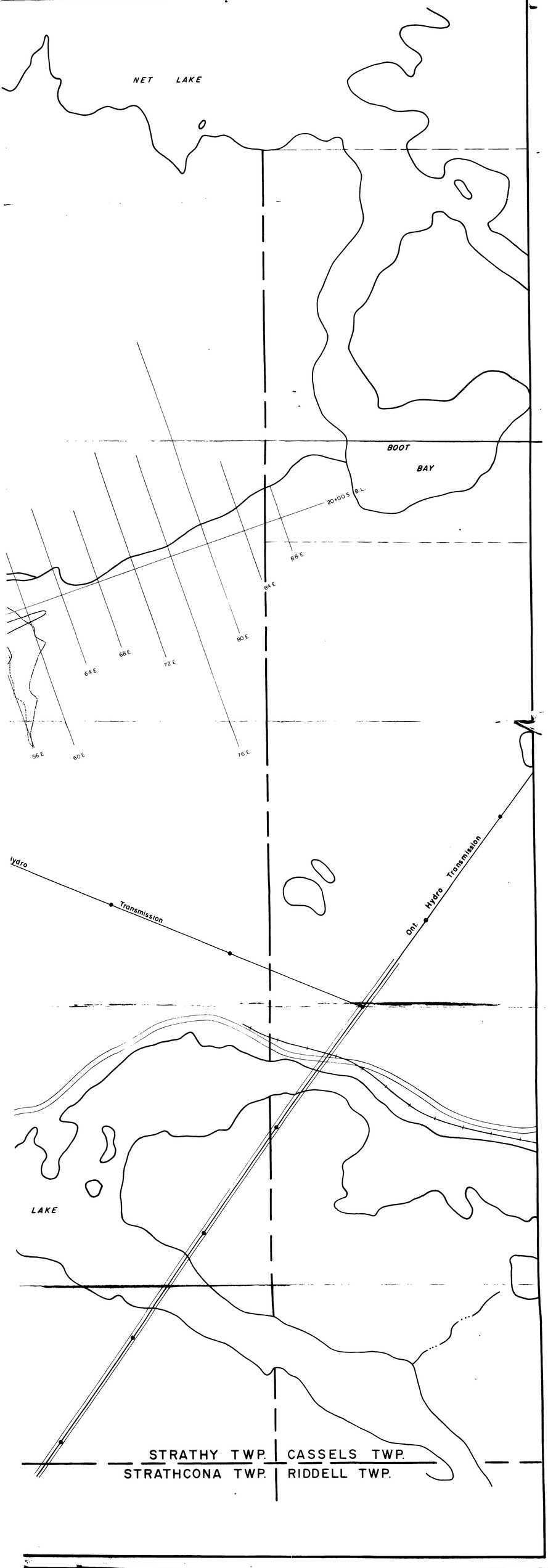
E.M.-16 SURVEY

(20 KHz.)

SCALE: 1 inch = 400 feet

(1:4800)

Dave R. Alexander
HOLLINGER EXPLORATION


NET LAKE
BOOT
BAY
20+00 S B.L.
56 E
60 E
64 E
68 E
72 E
76 E
80 E
84 E
88 E
Hydro
Transmission
Ont. Hydro Transmission
LAKE
STRATHY TWP. | CASSELS TWP.
STRATHCONA TWP. | RIDDELL TWP.

HOLLINGER MINES LTD.

Manderstrom – Morrison – Niemetz Option

STRATHY & CASSELS TWPS.

GEOLOGY

SCALE: 1 inch = 400 feet
(1:4800)

LEGEND

- Q – OLIVINE DIABASE
- O – QUARTZ DIABASE
- N – 1. GRANITE 8. PORPHYRY
- L – 1. DIORITE
- D – 1. RHYOLITE and RHYODACITE
- C – 1. DACITE
- B – MASSIVE BASIC FLOW ROCKS WHICH MAY, IN PART, BE SILL-LIKE BASIC INTRUSIVES
- A – 2. ANDESITE

ABBREVIATIONS

a – agglomerate	fel – felsic	por – porphyritic
amg – amygdaloidal	fg – fine grained	qv – quartz vein
bx – breccia	Δ – fragmental	s – sulphide
cc – carbonatized	gf – graphitic	sil – silicified
cg – coarse grained	lx – leucoxene	sp – spherulitic
ch – cherty	m.g. – medium grained	t – tuff
chl – chloritic	p – pillowed	v – variolitic
		ppy – porphyritic

- Outcrop
- Geological Contact
- Bedding with Dip
- Jointing
- Shearing
- Pillows (tops)
- Fault, Shear

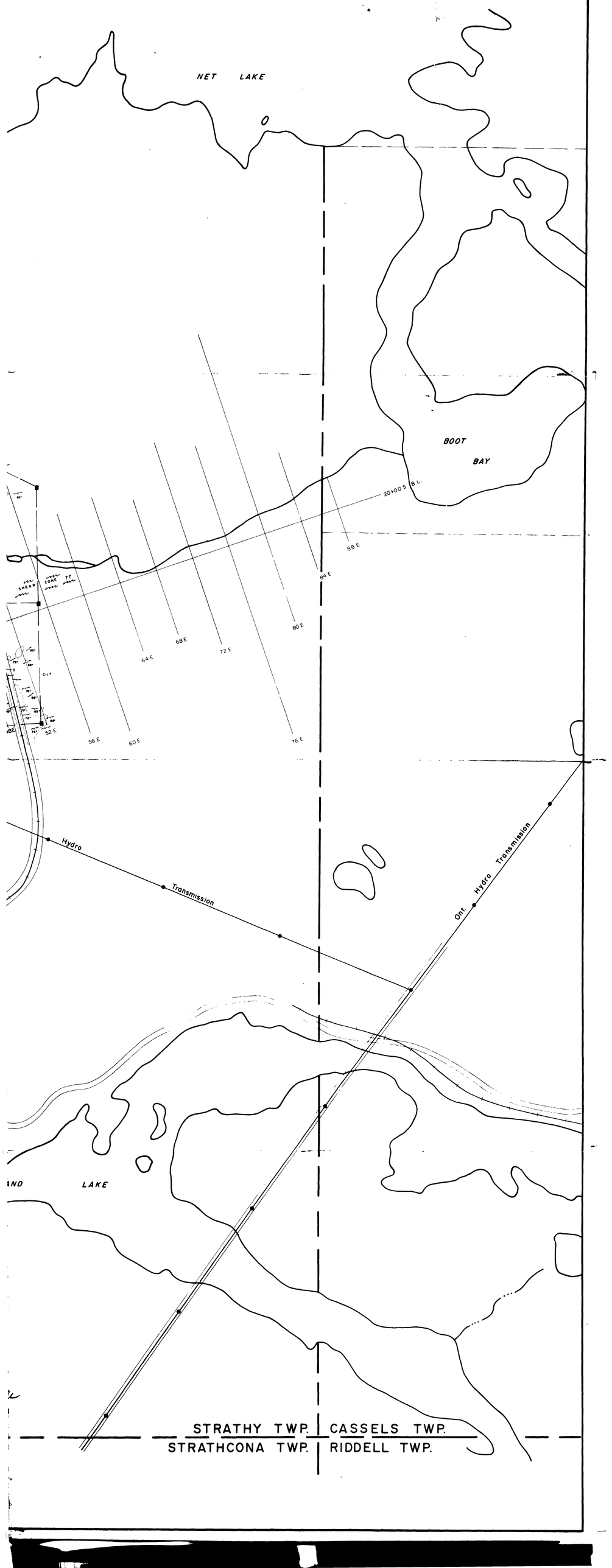
AST.

LAKE
ARSENIC
TOTEM LAKE
LINK LAKE
SNAKE ISL.
TEMAGAMI TOWNSITE
CARIBOU LAKE
PORTAGE BAY
(Northeast Arm of Lake Timagami)
Johnny Brook
MILNE SHERMAN HWY.
HWY 11
O.N.R.
N.T.P.L. GAS PIPELINE

24+00 W. BASE LINE
0+00 BASE LINE
0+00 Base Line

460737
460738
460739
460372
460373
449372
449373
449374
449375 (water claim)
MANITOBA and EASTERN MINES LTD.
No.1 SHAFT
No. 2 SHAFT Open Cut
399022
399978
437695
438552
438555
438554
BIG THREE PROPERTY
9 D.D.H.'s
D.D.H. No.1 H.G. MILLER
D.D.H. – ROY SILVER MINES LTD.
BIG DAN PROPERTY
also UNITED REEF PETROLEUM
SHAFT 40'
NORTH SHAFT
SOUTH SHAFT
D.D.H. No. 1
D.D.H. No. 2
D.D.H. No. 3
D.D.H. No. 4
D.D.H. No. 5
D.D.H. No. 6
D.D.H. No. 9
D.D.H. No. 10
MARALGO MINES LTD.
4 D.D.H.'s Mining Geophysics
D.D.H by Mining Geophysics
D.D.H's by Maralgo Mines Ltd.
D.D.H by Stadacona Rouyn Mines Ltd.
MAJOR SHEAR ZONE
LINK LAKE SHEAR ZONE
gf horizon
mineralized zone
sheared, ankeritic
ankeritic
gradational

Dave R. Alexand
HOLLINGER EXPLORATIO


NET LAKE
BOOT BAY
2040 S.B.L.
88 E
84 E
80 E
76 E
72 E
68 E
64 E
60 E
56 E
52 E
SHEAR ZONE
Hydro Transmission
Ont. Hydro Transmission
LAKE
STRATHY TWP. | CASSELS TWP.
STRATHCONA TWP. | RIDDELL TWP.